Gray Quadrangle, Maine

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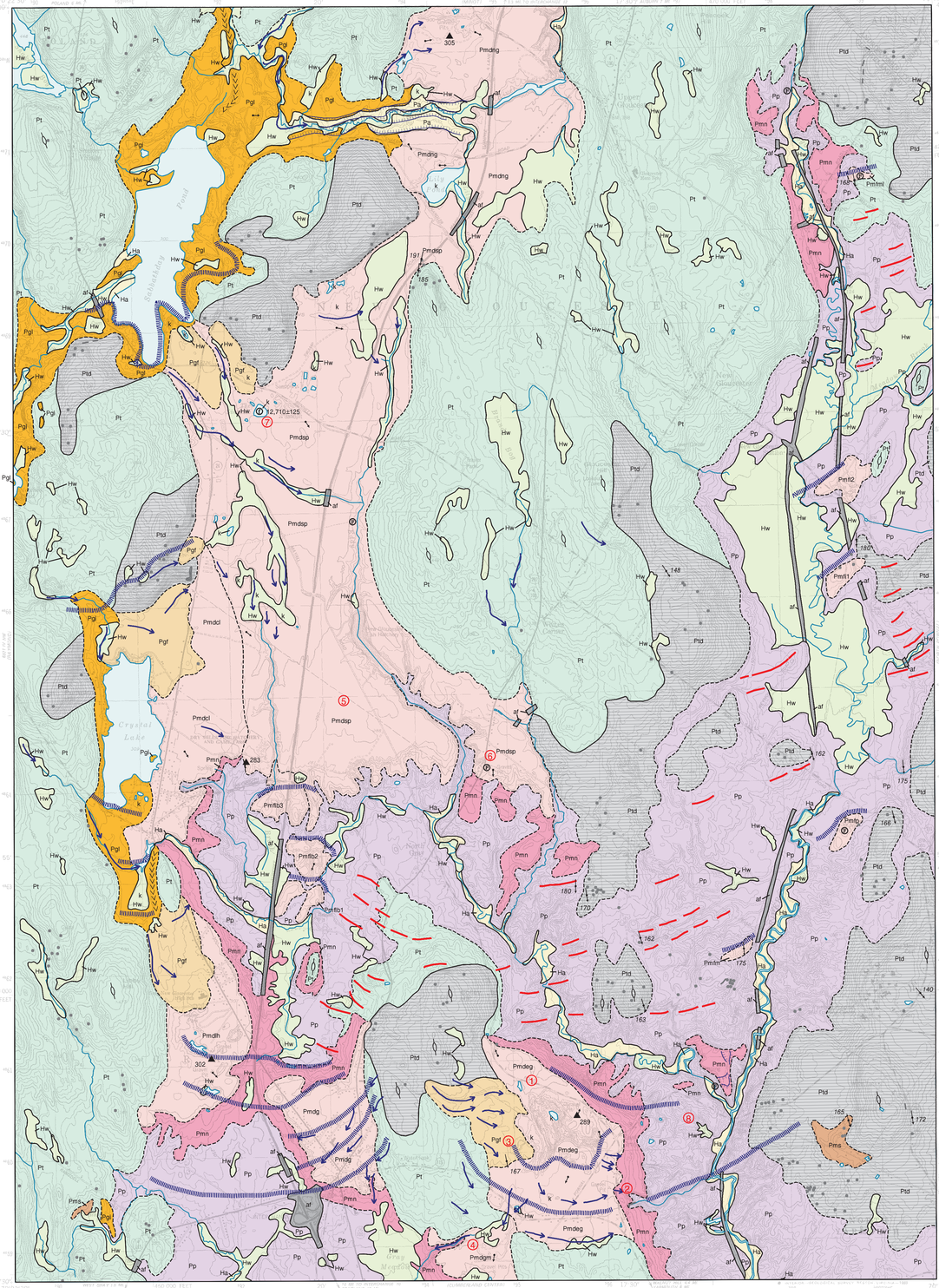
For additional information,
see Open-File Report 97-73.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by Thomas K. Weddle completed during the 1995-1996 field seasons; funding for this work provided by the U.S. Geological Survey STATEMAP program.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Gray quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

af **Artificial fill** - Includes landfills, highway and railroad embankments, and dredge spoil areas. These units are mapped only where they are resolvable using the contour lines on the map, or where they define the limits of wetland units. Minor artificial fill is present in virtually all developed areas of the quadrangle.

HOLOCENE DEPOSITS

Ha **Stream alluvium** - Gray to brown fine sand and silt with some gravel. Comprises flood plains along present streams and rivers. Extent of alluvium approximates areas of potential flooding.

Hw **Freshwater wetlands** - Muck, peat, silt, and sand. Poorly drained areas, often with standing water.

PLEISTOCENE DEPOSITS

Pa **Braided-stream alluvium** - Pleistocene alluvium consisting of fluvially deposited sand and gravel formed during the marine regression.

Pms **Marine shoreline** - Pleistocene beach and dune sands deposited during the regressive phase of marine submergence. Beach morphology is poorly preserved, but sand and gravel are present along the ridge crest.

Pmn **Marine nearshore deposits** - Pleistocene gravel, sand, and mud deposited as a result of wave activity in nearshore or shallow-marine environments; not associated with beach morphology.

Pp **Presumpscot Formation** - Massive to laminated silty clays with rare dropstones and occasional shelly horizons, which overlie rock and till, and are interbedded with and overlie end moraines and marine fan deposits; includes sand deposited as a distal unit of submarine fans.

Pmd **Marine ice-contact delta** - Glacial-marine delta composed primarily of sorted and stratified sand and gravel. Deposit was graded to surface of late-glacial sea and is distinguished by flat top and foreset and topset beds. Deltas have been assigned a unique geographic name listed below:

Pmdng - New Gloucester delta
Pmdsp - Sabbathday Pond delta
Pmdcl - Crystal Lake delta
Pmdlh - Libby Hill delta
Pmdg - Gray delta
Pmdeg - East Gray delta
Pmdgm - Gray Meadow delta

Pmf **Submarine outwash fans** - Fan-shaped glacial-marine sand and gravel accumulations formed at the mouth of subglacial tunnels along the receding late Pleistocene ice margin. The sand and gravel is interbedded with and overlain by Presumpscot Formation clays at the distal edges of the fans, and interlayered with and overlain by tills at their ice-contact faces. Some fans, or group of fans have been assigned a unique geographic name listed below:

Pmfm - Morse Road fan
Pmfp - Penny Road fan
$Pmfl_b$ - Libby Brook fans 1 to 3
$Pmfl_x$ - Intervale fans 1 to 2
Pmfml - Meadow Lane fan

Pgf **Glacial outwash fans and plains** - sand and gravel deposits comprised of alluvial fans and fan-shaped plains with large boulder and cobble clasts near er the fan apex.

Pgl **Ice-contact deposits** - Sand and gravel deposited against remnant masses of glacial ice; massive to well stratified; commonly has collapse features and irregular topography.

Pt **Till** - Gravelly to bouldery, sandy-matrix diamicton.

Ptd **Thin-drift areas** - Areas with generally less than ten feet of drift covering bedrock. Till overlies bedrock on hillslopes and ridge crests; Presumpscot Formation silty clay is present in depressions; and nearshore deposits overlie till, Presumpscot Formation, and bedrock on hillslopes and at the base of these slopes. Small rock outcrops, and areas of numerous small outcrops are shown as solid gray areas.

Contact - Indicates boundary between adjacent map units, dashed where approximate.

↘35 **Glacial striation or groove** - Arrow shows direction of former ice movement. Dot marks point of observation.

Streamlined hill - Hill shaped by glacial processes and reflecting regional ice flow.

End moraine - Ridge of till, sand, and gravel deposited and/or deformed by glacial ice.

Ice margin position - Line shows approximate position of ice margin during glacial retreat (shown only for major positions). Letters refer to map unit deposited when ice margin stood at each position.

Stream terrace scarp - Scarp separating different levels of stream terraces. Hachures on downslope side.

10,150±450 (F) **Marine fossil locality** - Indicates site where marine fossils were located. Sites where valid radiocarbon ages were obtained also are shown.

10,150±450 (F) **Non-marine fossil locality** - Indicates site where non-marine fossils were located. Sites where valid radiocarbon ages were obtained also are shown.

▲350 **Glaciomarine delta** - Elevation (in feet) of contact between topset and foreset beds in glaciomarine delta, which indicates former position of sea level.

Paleocurrent trend - Direction of current flow, inferred from dip of foreset bedor cross-bed trend.

<<<<< **Esker** - Gravel and sand deposited in an ice tunnel by subglacial meltwater stream. Chevrons point in direction of stream flow.

k **Kettle** - Depression on surface of stratified drift deposit where ice block buried by drift subsequently melted.

Meltwater channel - Channel eroded by meltwater or later meteoric runoff.

④ **Photo locality** - Location of photographed site shown and described in map legend.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Weddle, T. K., 1997, Surficial geology of the Gray 7.5-minute quadrangle, Androscoggin and Cumberland Counties, Maine: Maine Geological Survey, Open-File Report 97-73, 10 p.
2. Weddle, T. K., 1999, Surficial materials of the Gray quadrangle, Maine: Maine Geological Survey, Open-File Map 99-61.
3. Neil, C. D., 1999, Significant sand and gravel aquifers of the Gray quadrangle, Maine: Maine Geological Survey, Open-File Map 99-24.
4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.